
Appendix A: **Notes on Data Collection**

NOTES ON DATA COLLECTION

This compendium of key data on the state of the Bay Area transportation system is intended to provide the best snapshot possible, given existing information collected by Bay Area transportation agencies. Because the data have been gathered by multiple sources, responding to varying requirements, differences exist with respect to methodology, frequency, time period covered, level of detail and other variables. Following are some general comments, plus specific discussions of data by category.

Time Period Covered

Most data is collected and reported by calendar year (January 1 to December 31). Transit data is collected and reported by state fiscal year (July 1 to June 30), as is the custom for accounting purposes. Truck counts on freeways and state highways are collected by federal fiscal year (October 1 to September 30) because federal roadway funding is based, in part, on traffic counts.

Every effort was made to assemble consistent data for 1998 through 2002 (or, for data collected by fiscal year, 1997-98 through 2001-02). In some cases, this simply was not possible because data was not collected or analyzed for some years, or because of a lag in data availability. For example, the latest truck counts available at the time of publication were for fiscal year 2000-01.

Future Data Collection

In the future, the authors expect to collect supplemental data to fill gaps in the existing data. For example, traffic volumes on local roadways are not included in this report. While individual cities and counties collect traffic counts for various purposes, there is little consistency among jurisdictions in the timing or location of data collection. As a result, it is extremely difficult to aggregate the data and summarize it at the regional level. MTC is collecting traffic volumes on a selected set of local roadways for inclusion in the 2004 report.

Additionally, emerging technologies promise to make more complete data available in the future. Some of the techniques used to gather data for this report are labor-intensive, and therefore costly. For example, Caltrans employees drive specially equipped vehicles to collect data on freeway congestion, and transit operators hire people to wait at bus terminals to record on-time performance. Often, agencies can afford to collect data just a few, "typical" days a year due to the high costs of these manual data collection methods.

Examples of emerging data collection technologies that are expected to improve data in future reports include the following.

- Sensors in the freeway pavement and on the roadside will continuously count vehicles and monitor travel speeds on freeways. Whereas traffic counts now are taken just a few days a year, this automated data would be available 24 hours a day, 365 days a year, giving us a much more accurate understanding of roadway conditions. This information will be sent to Caltrans' Transportation Management Center in Oakland, where it will be used to manage freeway traffic flow, provided in real time to travelers seeking information on congestion, and archived for use in reports such as this one.
- Sensors will use FasTrak™ electronic toll tags installed in autos and trucks to estimate the time it takes to travel between fixed points on the freeway, 24 hours a day, 365 days a year. The first sensors are expected to be operational in the Interstate 80 corridor in late 2003.
- "Smart" traffic signal systems will continuously count vehicles on local roadways. These systems will be deployed on only a small subset of streets in the near future, however, so most traffic counts on local roadways will continue to be done by traditional methods on an occasional basis.
- Transit fleet management systems will track the times that buses and trains arrive and depart transit stops. By comparing these times to transit schedules, the systems will generate more complete on-time performance statistics.

Data Collection Techniques Used for This Report

System in Brief

Population and Employment Trends (page 3)

Population data is taken from the California Department of Finance estimates. The estimates in this report reflect population as of July 1 of each year. City and county population estimates are available at <www.dof.ca.gov/HTML/DEMOGRAP/repndat.htm#estimates>.

Employment data is taken from the California Employment Development Department (EDD) “Wages and Salary” data series. EDD estimates annual employment by industry based on reports by employers to the state on employment securities and unemployment insurance. Self-employed workers, unpaid family workers, private household workers, and individuals on unpaid leave from work are not included in the data. Because it is the number of jobs rather than workers that is reported, workers holding more than one job may be counted more than once. Employment data is published on the EDD Web site at www.calmis.cahwnet.gov.

Trends in Commuting (page 4)

The annual Commute Profile telephone poll conducted by RIDES for Bay Area Commuters, Inc. provides information on commuter behavior and the factors that influence commute decisions. It is the only region-wide, annual study of commuters’ perceptions, such as whether people feel their commutes have improved or worsened over the past year. The poll, which is conducted in the spring of each year, surveys adults who are employed full-time outside the home. The size of the poll has varied over the years based on the amount of funding available. In 1998, the sample size was about 1,600 Bay Area commuters. Since 1999, the poll has included approximately 3,600 of the Bay Area’s estimated 3.5 million commuters each year. The Commute Profile report includes a complete description of the survey methodology and the confidence level. Copies of the report are available from RIDES for Bay Area Commuters, Inc. or can be downloaded from <http://rideshare.511.org/research/>.

Mobility: Getting Around the Bay Area

Freeway Congestion (pages 8-11)

The measure used to indicate congestion is daily vehicle hours of delay. Delay occurs when the average speed falls below 35 miles per hour for 15 minutes or more. Caltrans District 4 has collected this data every year since 1981 (except for 1985 and 1997, when budget limitations forced the district to forgo the program). Caltrans employees drive specially equipped vehicles on the freeway system during morning and evening commute hours to collect information on average travel speeds and travel times, which is then used to calculate daily delay. Data is collected on Tuesdays, Wednesdays and Thursdays during the spring and fall of each year. Complete freeway congestion data for the Bay Area is published by Caltrans in the report series *Bay Area Freeway Congestion Data*.

Selected Commute Times (pages 12-15)

It is possible to calculate the driving time between two locations from the data Caltrans District 4 collects to monitor freeway congestion (see above). Because data is available for freeway travel only, the reported commute times do not account for the time it takes to drive from one’s home to the freeway or from the freeway to one’s workplace. The driving times included in this report were calculated based on an 8:30 a.m. arrival at the destination cities — San Francisco, Oakland and San Jose.

For the 2003 report, MTC staff calculated the time it would take to travel by transit from the same general locations to each destination city to arrive no later than 8:30 a.m. The transit travel times were calculated from printed schedules or, where available, by using MTC’s TakeTransitSM Trip Planner (available at <http://transit.511.org>). The transit travel times are the time between transit stops or stations. Like the freeway travel times, they do not include the time it takes to get from home to the first transit stop or from the last transit stop to the workplace.

Freeway Traffic Volumes (pages 16-17)

The annual average daily traffic volume is the number of vehicles that pass by a given freeway location during the course of a year, divided by 365. The traffic volumes included in this report are for locations with permanent count stations. Only a small number of locations have permanent counters that provide data on a continuous basis from year to year. Caltrans collects traffic counts at other freeway and state highway locations with electronic instruments that are moved from location to location throughout the state on a seven-year cycle. Locations with these cyclic traffic counts were omitted from this report because the data does not show year-to-year trends. The complete database of traffic volumes throughout the state is available on the Caltrans Web site at www.dot.ca.gov/hq/traffops/saferestr/trafdata/.

Bridge Traffic Volumes (page 16)

The Bay Area Toll Authority, which has administered the first dollar of the \$2 toll on state-owned bridges since 1998, tracks the number of vehicles crossing each of the seven state-owned bridges. Traffic counts reflect vehicle crossings in the tolled direction for accounting purposes. The Golden Gate Bridge, Highway and Transportation District tracks this number for the Golden Gate Bridge. The average daily traffic for each bridge is the total annual traffic divided by 365 days. Data on traffic and revenue for the seven state-owned bridges is available on the Bay Area Toll

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Authority Web site at <www.mtc.ca.gov/bata/tolls.htm>. Data on traffic and revenue for the Golden Gate Bridge is available on the Web at <www.goldengatebridge.org/research/GGBTraffToll.html>.

Truck Traffic (pages 18-19)

Annual average daily truck traffic is the total number of trucks that pass by a given location in a year, divided by 365 days. All trucks with more than two axles are counted. Two-axle trucks over 1.5 tons with dual rear tires also are counted. Excluded are pickup trucks and vans with only four tires. Annual average truck volumes are calculated for the federal fiscal year, which runs from October 1 to September 30.

Caltrans conducts truck counting throughout the state in a program of continuous sampling on a six-year cycle. Certain locations with truck weigh stations, including one Bay Area location, are monitored continuously; however, most routes are monitored only once or twice in a six-year period. As a result, the data is best suited to track changes over multiple years rather than annual changes. At the time of this report, data for fiscal year 2000-01 was the most current data available. Data on truck volumes throughout the state is available on the Caltrans Web site at <www.dot.ca.gov/hq/traffops/safesr/trafdata/>. This information also is published annually by Caltrans in the report series *Annual Average Daily Truck Traffic on the California State Highway System*.

Carpool Lanes — Time Savings and Usage (pages 20-23)

Caltrans District 4 collects data on carpool-lane usage and travel-time savings annually. Data on lane usage is compiled from direct observations by people situated on the side of the freeway adjacent to the carpool lanes. Travel-time savings are computed by comparing travel time in the carpool lane with that in the adjacent mixed-flow lanes during the peak morning and evening commute hours. For carpool lanes that are not congested, travel time is based on the speed limit on the freeway. For carpool lanes that are congested, Caltrans drives specially equipped “floating cars” to record travel time and speed. The same “floating car” technique is used to measure the travel time in adjacent mixed-flow lanes. Caltrans District 4 publishes a report annually with complete data on carpool-lane usage and travel-time savings. The report also includes detailed information on the hours of operation, number of people using the carpool lane compared to adjacent general purpose lanes, and violation rates.

Local Traffic (pages 24-25)

Under state law, county congestion management agencies are charged with monitoring congestion on local roadways. Two Bay Area counties, Sonoma County and Napa County, have exercised an option in the law to opt out of this requirement. The remaining seven counties monitor congestion on local roadways and publish the results at least every two years in a county congestion monitoring report. Most counties report in odd years; Alameda and Contra Costa counties report in even years. Santa Clara County has been reporting every year.

The congestion management agencies measure local roadway congestion by calculating the “level of service” on a selected set of high-priority roads during peak commute periods. Level of service describes traffic conditions based on speed and travel time, volume and capacity, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. Level of service is expressed in grades from A through F, with level of service A representing the best operating conditions and level of service F the worst. At level of service A, B and C, traffic flows smoothly and delay is minimal. This report characterizes these conditions as “uncongested.” At level of service D and E, traffic flow becomes unstable, conditions characterized in this report as “moderately congested.” At level of service F, traffic is stop and go, characterized in this report as “severely congested.”

The level of service grade is assigned based on the delay experienced by vehicles traveling through major intersections or on average travel speeds over selected segments of local roadways. It is noteworthy that the procedures for monitoring local roadway level of service are established on a county-by-county basis. As a result, it is more appropriate to compare the results for each county from year to year than it is to compare results across different counties. Links to congestion management agencies for counties in the Bay Area may be found on the MTC Web site at <www.mtc.ca.gov/links/lkindex.htm>.

Transit On-Time Performance (pages 26-27)

Transit operators monitor on-time performance as a measure of the quality of the service they provide. Like most data on transit operations, on-time performance is reported by fiscal year. Data is usually collected by persons who record the arrival time of individual transit vehicles at key stops. (BART’s central computer system automates collection of on-time performance data.) On-time performance data is used by operators primarily as an internal management tool. When deteriorating on-time performance can be traced back to increasing roadway congestion, the data may be

used to develop more realistic, revised schedules. San Francisco Muni publishes on-time performance data in its quarterly performance reports as required under Proposition E, passed by San Francisco voters in 1999.

Transit Ridership (pages 28-29)

This report uses transit boardings as a measure of ridership. A boarding refers to each time a passenger enters a transit vehicle or train station. One person may board multiple vehicles to complete a trip. Methods used to collect this ridership data include tracking transit fare receipts and hiring people to count passenger boardings. Transit operators report ridership for each fiscal year to the Federal Transit Administration for inclusion in the National Transit Database. MTC summarizes transit ridership and other operating statistics for Bay Area operators in its annual report, *Statistical Summary of Bay Area Transit Operators*, which covers a rolling five-year period.

Safety

Motor Vehicle Collisions and Motor Vehicle Collisions Involving Pedestrians or Cyclists (pages 32-35)

The California Highway Patrol (CHP) maintains the most complete data on motor vehicle collisions, including those that involve pedestrians or cyclists. The database, called Statewide Integrated Traffic Records System, includes all collisions reported to local law enforcement as well as the Highway Patrol. The Highway Patrol publishes the series *Annual Report of Fatal and Injury Motor Vehicle Traffic Collisions*, which includes summary statistics by county and for the entire state. This is available on the Web at <www.chp.ca.gov/html/publications.html>. Data at a less aggregated level can be requested from the California Highway Patrol. (Note: the 2002 collision data displayed on pages 32-35 is preliminary and is subject to confirmation by CHP.)

Transit Safety Statistics (pages 36-37)

The *State of the System* report uses the number of injuries and fatalities involving transit as a measure of transit safety. In 2002, the Federal Transit Administration significantly modified reporting requirements for safety and security incidents. We have chosen not to publish transit safety statistics for fiscal year 2001-02 due to concerns about the quality of the data reported during this transition period. Instead, statistics from the 2002 *State of the System* report have been repeated here. Data quality is expected to

improve in future years as the transit operators get used to the new requirements, and the most current transit safety data should be included in future reports.

The statistics represent a wide range of incidents ranging from people who slip and fall while boarding a bus to those injured or killed in collisions with transit vehicles. The statistics include patrons, employees and other individuals if they are injured or killed on transit property or by transit vehicles. Transit operators report injuries and fatalities to the Federal Transit Administration as part of the National Transit Database project. The National Transit Database also includes statistics on system security (robberies or vehicle thefts, for example). Security statistics for Bay Area transit operators may be included in future reports. Data on individual Bay Area transit operators and national statistics are currently available on the Web at <www.ntdprogram.com/>.

State of Repair

Freeway Pavement Conditions (pages 40-41)

The condition of freeway pavement is measured in terms of the International Roughness Index (IRI), an indicator of ride comfort. Caltrans surveys pavement condition using roving vehicles that measure the deviation from a smooth surface in inches per mile. A lower IRI indicates less deviation from a smooth surface, or better ride quality.

For the most rigid pavement surfaces — slabs of pavement connected by joints — IRI ratings of 213 or less are considered acceptable by Caltrans. For seamless-style pavement surfaces, IRI ratings of 224 or less fall within the acceptable range.

Local Roadway Pavement Conditions (pages 42-43)

Most Bay Area jurisdictions use MTC's Pavement Management System, or an equivalent system, to track conditions of streets and roads and develop cost-effective repair schedules. MTC's Pavement Management System measures pavement conditions according to a pavement condition index (PCI) that ranges from 0 to 100, where 100 is the best possible score. Surveyors record the type and severity of pavement distresses, such as cracking, weathering and patching through physical inspections. This information is then entered into the Pavement Management System to calculate the PCI.

The characterization of pavement conditions in 2002 is based on the most recent data submitted to MTC by local jurisdictions. For those jurisdictions (55 in number) that had their last inspections done in 2002, the PCI scores were considered current. For

Notes on Data Collection (continued)

the remaining jurisdictions — those whose most recent inspections were done in years prior to 2002 — MTC staff used its Pavement Management System software to project PCI scores forward to 2002, relying on estimates (provided by individual jurisdictions or by the State Controller's Office) of revenue available to each jurisdiction for local roadway maintenance.

Transit Service Calls (pages 44-45)

A service call occurs any time transit service is disrupted because a transit vehicle cannot complete a scheduled trip or cannot start the next scheduled trip. Transit operators report total service calls to the Federal Transit Administration as part of the National Transit Database. Operators also report the miles of service provided annually (annual revenue service miles) as part of the National Transit Database. MTC used these data to calculate the total number of service calls per million miles of service provided by the seven largest bus and rail operators.

Airports and Seaports

Airports — Passenger and Cargo Volumes (pages 48-49)

Statistics on airport passengers are based on information supplied to the airports from the airline carriers' computer reservation systems. These numbers are in turn used to collect landing fees from the carriers and for planning efforts at the airports. Statistics on air cargo are reported by private carriers to the airports. Private carriers (e.g., Federal Express, UPS) submit tonnage reports to the airports for planning and billing purposes.

Seaports — Marine Cargo Volumes (pages 50-51)

Private operators at the ports collect data on marine cargo. For bulk goods, tonnage is tracked and used by the ports to collect fees. For containers, fees are paid to the port based on the contents of the containers and the number of total containers is tracked for planning purposes.

Appendix B:
**Congested Freeway Locations –
Morning and Evening
Commutes, 2002**

Morning Peak-Period Congested Locations, 2002 (ordered by county and route)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
ALA	24	E	1,270	6:30-9:45	Route 13 to Caldecott Tunnel
ALA	24	W	400	7:05-9:20	At Telegraph Avenue
ALA/CC	80	W	9,710	5:45-9:30	Willow Avenue to Bay Bridge metering lights
ALA	84	S	2,860	5:30-9:50	Newark to Dumbarton Bridge toll plaza
ALA	92	W	1,020	6:00-10:00	Clawiter to San Mateo-Hayward Bridge toll plaza
ALA	238	N	290	5:45-9:05	I-580 to East 14th Street
ALA	580	E	40	8:10-9:25	Central Avenue to Buchanan Street
ALA	580	W	700	6:00-7:45	At North Flynn Road
ALA	580	W	3,910	6:15-9:30	Vasco Road to Airway Boulevard
ALA	580	W	350	6:45-9:15	At El Charro Road
ALA	580	W	250	7:10-9:30	Redwood Road to Route 238
ALA	580	W	610	7:35-8:55	Coolidge Avenue to Fruitvale Avenue and at Park Boulevard
ALA	580	W	710	6:25-9:05	Route 24 to I-80
ALA	680	N	130	7:50-9:00	At I-580 and at Alcosta Boulevard
ALA	680	S	3,600	5:55-10:45	Sunol Road to Route 262
ALA	880	N	2,190	6:20-9:30	0.4 miles south of HOV lane split to Bay Bridge
ALA	880	N	760	7:25-9:15	At Fremont and north of Whipple to Route 92
ALA	880	N	120	7:35-8:30	At Route 238
ALA	880	N	200	7:50-9:05	Route 238 to Marina Boulevard
ALA	880	N	280	7:50-9:00	Hegenberger Road to High Street
ALA	880	S	1,220	6:25-9:00	Hesperian Boulevard to Route 92
ALA	880	S	1,090	6:20-8:55	At north of Industrial and Whipple to Decoto Road
ALA	880	S	8,880	6:00-10:45	Thornton to Mowry and Stevenson to north of Dixon Landing Road
CC	4	W	430	7:00-8:20	Willow Pass Road (Bay Point) to Willow Pass Road (Concord)
CC	4	W	3,640	5:30-9:00	Hillcrest Road to Loveridge Road
CC	24	W	900	7:20-9:15	St. Stephens to Caldecott Tunnel
CC	24	W	220	7:35-9:05	I-680 to east of Pleasant Hill Road
CC	242	S	100	6:45-8:30	Concord Avenue to I-680
CC	580	W	320	6:30-9:00	Marine Street undercrossing to Richmond-San Rafael Bridge toll plaza
CC	680	N	400	7:35-9:10	Sycamore Valley Road to El Pintado Road

County abbreviations: ALA=Alameda; CC=Contra Costa; MRN=Marin; SCL=Santa Clara; SF=San Francisco; SM=San Mateo; SOL=Solano; SON=Sonoma

Morning Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
CC	680	S	2,010	6:55-9:35	Route 24 to Diablo Road
CC	680	S	900	6:35-8:40	Route 242 to Geary Road and at North Main Street
CC	680	S	310	6:35-8:35	At Concord Avenue/Contra Costa Boulevard
CC	680	S	840	6:35-8:50	At Benicia-Martinez Bridge toll plaza and north of Arthur Road to Route 4
MRN	101	S	90	7:10-9:15	At I-580 and north of Route 131
MRN	101	S	3,520	6:35-10:00	Rowland Boulevard to I-580
SCL	17	N	180	7:50-9:10	Camden Avenue to Hamilton Avenue
SCL	85	N	310	6:10-9:00	At Bernal Road on-ramp (metering lights)
SCL	85	N	470	7:00-9:30	Route 17 to 0.8 miles north of Winchester Boulevard
SCL	85	N	760	7:10-9:00	I-280 to north of Fremont Avenue
SCL	85	N	520	7:10-9:00	At U.S. 101 junction
SCL	87	N	40	9:20-10:00	Curtner Avenue to Almaden Expressway
SCL	101	N	990	5:30-8:30	Dunne Avenue to Burnett Avenue overcrossing
SCL	101	N	220	7:00-8:50	At Tully Road
SCL	101	N	2,170	7:00-9:30	I-280 to Trimble Road
SCL	101	N	190	7:30-9:20	Route 85 to Renstorff Avenue
SCL	237	E	30	7:50-8:50	Route 85 to Dana Street
SCL	237	E	80	8:00-9:10	At Mathilda Avenue and at McCarthy Boulevard
SCL	237	W	280	7:15-9:10	I-880 to Zanker Avenue
SCL	280	N	1,570	7:15-8:15	U.S. 101 to I-880
SCL	280	N	220	7:45-9:10	North of Winchester Boulevard to Saratoga Avenue
SCL	280	N	40	7:10-8:10	Route 85 to 1 mile north of Foothill Expressway
SCL	680	N	150	7:30-8:20	Capitol Expressway to McKee Road
SCL	680	S	210	6:45-8:00	At U.S. 101
SCL	880	N	1,240	6:45-10:00	North First Street to Brokaw Road
SCL	880	S	100	7:30-8:40	Montague Expressway to U.S. 101
SF/ALA	80	W	460	6:05-8:35	Incline section of Bay Bridge to Fremont Street
SF	80	E	1,260	7:05-9:50	U.S. 101 to Sterling Street
SF	101	S	180	7:40-9:10	I-280 to Harney Way
SF	101	N	1,020	7:25-9:45	Aleman Avenue to I-80
SF	101	N	70	6:35-9:30	At Fell Street offramp
SF	101	S	30	7:30-9:35	At I-80

Morning Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (AM)	LOCATION
SF	280	N	470	7:10-8:40	Monterey Boulevard to U.S. 101
SF	280	N	150	7:30-9:10	Indiana Street to King Street
SM	92	W	30	7:45-8:10	U.S. 101 to Alameda De Las Pulgas
SM/SCL	101	S	1,100	7:15-9:15	Whipple Avenue to Route 85
SM	101	N	110	8:00-9:10	Marsh Road to Woodside Road
SM	101	N	340	7:30-9:00	Route 92 to Third Avenue and at Peninsula Avenue
SM	101	S	460	7:10-9:00	Third Avenue to Hillsdale Boulevard
SM	101	S	210	7:10-8:30	Holly Road to Whipple Avenue
SM	101	S	400	7:30-9:10	San Francisco International Airport to Broadway
SM	101	S	150	7:50-8:50	Marina Boulevard to Linden Avenue
SM	280	S	420	7:30-9:00	Route 1 to Avalon Drive
SOL	37	W	70	6:40-8:40	At Skaggs Island Road and at Sonoma/Solano county line
SOL	37	W	220	6:10-8:15	Postmile 4 to Skaggs Island Road and Railroad Avenue (Mare Island) to Postmile 6
SOL	80	W	570	6:10-8:00	Georgia Street to west of Sonoma Boulevard
SOL	80	W	950	6:00-8:20	West of Oliver Street to east of Cordelia truck scales
SOL	680	S	120	6:35-8:15	South of Industrial Way to Benicia-Martinez Bridge toll plaza
SOL	780	E	190	6:15-7:55	East Second Street to Benicia-Martinez Bridge toll plaza
SON	101	S	570	5:45-8:05	South of Redwood Highway to north of Kastania Road
SON	101	S	160	6:25-9:20	At Route 12
SON	101	S	210	7:15-8:55	At Steele Lane
SON	101	S	200	7:15-8:50	South of Airport Boulevard to River Road
SON	101	N	630	7:10-9:15	North of Golf Course Drive to north of Baker Road

Evening Peak-Period Congested Locations, 2002 (ordered by county and route)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
ALA	24	E	1,150	3:30-6:45	Claremont Avenue to Caldecott Tunnel
ALA/SF	80	E	1,150	3:25-6:15	At Sterling Street and county line to I-580
ALA	80	E	2,520	3:05-7:00	I-580 to Gilman Street
ALA/SF	80	W	1,090	5:05-6:55	Incline section of Bay Bridge to Fifth Street
ALA	80	W	530	3:20-6:10	Buchanan Street to I-580/880
ALA	84	N	160	3:25-6:15	Newark Boulevard to I-880
ALA/SM	92	E	1,180	3:30-6:45	San Mateo/Alameda county line to I-880
ALA	238	N	270	3:00-6:45	I-580 to East 14th Street
ALA	238	S	500	3:45-6:35	I-880 to Route 185
ALA	580	E	260	3:35-7:05	At Route 84
ALA	580	E	7,040	2:55-6:40	Hopyard Road to west of El Charro Road
ALA	580	E	990	4:35-6:45	Route 24 to Coolidge Avenue
ALA	580	W	220	4:00-7:00	Strobridge Avenue to Route 238
ALA	680	N	660	3:15-6:15	At Scott Creek and at Route 262 to Washington
ALA	880	N	850	2:50-8:10	South of Fremont Boulevard to Auto Mall Parkway
ALA	880	N	690	3:40-6:20	At Stevenson Boulevard and north of Route 84 to Decoto Road
ALA	880	N	2,360	3:00-6:50	Fremont Boulevard to Tennyson Road
ALA	880	N	310	4:10-7:05	Route 92 to south of Hesperian Boulevard
ALA	880	N	230	3:20-4:55	At south of High Street
ALA	880	S	370	3:30-6:05	At Tennyson Road
ALA	880	S	600	4:10-7:05	Hesperian Boulevard to Route 92
ALA	880	S	120	4:45-6:15	At Hegenberger Road and at Marina Boulevard
CC	4	E	580	3:45-7:00	Route 242 to Port Chicago Highway
CC	4	E	1,710	3:35-7:00	Bailey Road to Loveridge Road
CC	4	E	430	3:25-7:20	East of Loveridge to L Street
CC	24	E	190	3:50-6:00	At Acalanes and at I-680
CC	24	W	1,340	3:15-7:30	West of Camino Pablo to Caldecott Tunnel
CC/ALA	80	E	530	4:00-6:30	Buchanan Street to San Pablo Avenue
CC	80	E	340	4:00-6:15	El Portal Road to Pinole Valley Road
CC/SOL	80	E	240	3:10-6:25	At Carquinez Bridge toll plaza
CC	680	N	870	3:45-6:35	North of Bollinger Canyon Road to Sycamore Valley Road and El Cerro Boulevard to El Pintado Road

County abbreviations: ALA=Alameda; CC=Contra Costa; MRN=Marin; SCL=Santa Clara; SF=San Francisco; SM=San Mateo; SOL=Solano; SON=Sonoma

Evening Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
CC	680	N	830	3:55-6:00	Stone Valley Road to Treat Boulevard
CC	680	N	940	3:20-6:50	At Route 4 and Arthur to Benicia-Martinez Bridge toll plaza
MRN	101	S	990	4:25-7:20	End of Waldo Tunnel to beginning of Golden Gate Bridge
MRN	101	N	2,060	2:45-6:15	North of Seminary Drive to Mission Avenue
MRN	101	N	680	3:20-6:25	North of De Long Avenue to beginning of expressway
MRN	101	N	270	3:15-6:30	At Sanitary Road
MRN	580	W	800	2:40-6:50	Bellam Road to U.S. 101
SCL	85	S	70	5:00-5:50	At Route 87
SCL	85	S	190	4:30-7:00	Route 17 to south of Union Avenue
SCL	85	S	200	5:00-7:00	Saratoga Avenue to 1 mile south of Saratoga Avenue
SCL	85	S	470	4:45-7:00	Stevens Creek Boulevard to De Anza Boulevard
SCL	85	S	780	4:00-7:00	Evelyn Avenue to Fremont Avenue
SCL	87	S	1,640	3:00-8:00	I-280 to Alma Avenue
SCL	101	S	2,100	2:45-6:30	Bernal Avenue to 1 mile south of Route 85
SCL	101	S	1,360	4:30-7:15	East Santa Clara Street to Tully Road
SCL	101	S	2,050	4:10-7:00	Great America Parkway to 13th Street
SCL	101	N	30	5:30-6:30	At Great America Parkway
SCL	101	N	1,540	4:15-7:15	Ellis Street to Rengstorff Avenue
SCL/SM	101	S	1,300	4:20-7:00	University Avenue to Shoreline Boulevard
SCL	237	E	100	4:30-6:20	North First Street to Zanker Road
SCL	237	E	170	4:30-6:20	At I-880 junction (connector)
SCL	237	W	240	5:30-6:15	U.S. 101 to Dana Street
SCL	237	W	130	5:10-7:10	At Zanker Road
SCL	280	N	70	5:20-6:15	At I-880 junction and on Route 237/I-880 connector
SCL	280	S	1,290	4:00-6:30	Route 17/I-880 to 11th Street
SCL	280	S	200	5:00-6:40	Wolfe Road to Lawrence Expressway
SCL	280	S	150	5:10-6:20	El Monte Road to Magdalena Avenue
SCL	680	S	900	4:15-6:40	Montague Expressway to Berryessa Road
SCL	680	N	810	4:00-6:00	Calaveras Road to Scott Creek Road
SCL	880	S	150	5:20-6:45	U.S. 101 to I-280
SCL	880	S	2,020	3:00-7:50	Great Mall Parkway to Brokaw Road
SCL	880	N	3,660	3:15-7:10	Montague Expressway to Dixon Landing Road

Evening Peak-Period Congested Locations, 2002 (continued)

COUNTY	ROUTE	DIR.	DELAY (vehicle hours)	DURATION (PM)	LOCATION
SF	80	E	4,310	2:50-7:45	I-80/U.S. 101 to Sterling Street
SF	80	W	50	4:50-6:10	5th Street to U.S. 101
SF	101	N	1,650	3:10-6:35	Cesar Chavez Street to I-80
SF	101	N	170	3:55-6:15	U.S. 101/I-80 to Fell Street
SF	101	S	140	3:45-5:35	South Van Ness to I-80
SF	280	N	60	5:05-6:25	6th Street to King/5th Street
SF/SM	280	S	210	5:05-6:25	At U.S. 101 and at Route 1
SF	280	S	90	4:55-6:20	Mariposa Street to Pennsylvania Avenue
SM	92	W	50	5:15-6:10	U.S. 101 to Route 82
SM	92	E	1,380	3:00-7:00	0.4 miles east of Foster City Boulevard to 1.5 miles west of Alameda/San Mateo county line
SM	101	N	1,180	4:00-7:00	Marsh Road to Ralston Avenue
SM	101	N	810	5:00-7:00	Route 92 to Third Avenue
SM	101	N	30	5:30-6:00	Broadway to Milbrae Avenue
SM	101	S	110	4:50-5:50	At Woodside Road
SM	101	S	80	5:00-5:50	North of Broadway
SM	101	S	110	3:30-4:30	At Milbrae Avenue
SM	280	N	360	5:20-6:45	Alpine Road to north of Sandhill Road
SM	280	N	470	5:00-7:00	Crystal Springs Avenue to Westborough Boulevard
SM	380	W	20	5:15-6:15	At I-280
SOL	37	E	170	3:45-6:10	At Route 121
SOL	80	E	740	3:30-6:10	West of Jameson Canyon Road (Route 12) to Cordelia truck scales
SOL	80	E	100	5:10-6:10	East of Magellan Road to east of Travis Boulevard
SOL	680	N	760	3:05-6:15	South of Cordelia Street to I-80
SON	101	N	100	4:25-6:05	North of E. Washington Avenue
SON	101	N	120	3:50-6:10	At Redwood Highway
SON	101	N	1,420	2:30-6:45	At Santa Rosa Avenue and north of Todd Road to south of Steele Lane
SON	101	S	860	2:35-6:25	North of Hopper Avenue to Route 12

Appendix C:

**Injury and Fatal Motor Vehicle
Collisions Involving Bicyclists
and Pedestrians by Bay Area
Jurisdiction, 2002**

Injury and Fatal Motor Vehicle Collisions Involving Bicyclists and Pedestrians by Bay Area Jurisdiction, 2002

JURISDICTION	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998-2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998-2002 ANNUAL AVG. FATAL and INJURY
Alameda County								
Alameda	0	34	34	33	0	29	29	34
Albany	0	11	11	7	0	5	5	7
Berkeley	1	126	127	113	1	129	130	143
Dublin	1	4	5	5	0	2	2	5
Emeryville	0	8	8	9	0	7	7	6
Fremont	4	59	63	68	0	66	66	65
Hayward	2	73	75	78	1	49	50	58
Livermore	1	16	17	21	0	33	33	34
Newark	1	11	12	10	0	11	11	11
Oakland	15	302	317	295	1	129	130	167
Piedmont	0	3	3	2	0	2	2	1
Pleasanton	1	14	15	12	0	16	16	17
San Leandro	1	33	34	37	0	26	26	24
Union City	1	13	14	14	0	9	9	11
Unincorporated Alameda County	0	40	40	57	0	47	47	38
Alameda County Total	28	747	775	763	3	560	563	620
Contra Costa County								
Antioch	1	24	25	23	0	20	20	23
Brentwood	1	10	11	7	0	7	7	5
Clayton	0	0	0	1	0	1	1	1
Concord	0	11	11	42	0	8	8	56
Danville	0	6	6	5	0	12	12	12
El Cerrito	0	15	15	14	0	13	13	11
Hercules	0	0	0	2	0	0	0	0
Kensington	0	0	0	1	0	0	0	1
Lafayette	0	3	3	4	0	8	8	5
Martinez	0	9	9	7	0	7	7	6
Moraga	0	0	0	1	0	1	1	2
Oakley	0	4	4	1	0	5	5	2
Orinda	0	7	7	4	0	5	5	2
Pinole	2	3	5	7	0	2	2	4
Pittsburg	0	17	17	18	0	7	7	7

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

PEDESTRIAN-INVOLVED COLLISIONS

JURISDICTION	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
Pleasant Hill	1	10	11	12
Richmond	3	59	62	54
San Pablo	0	16	16	22
San Ramon	0	6	6	6
Walnut Creek	0	20	20	20
Unincorporated Contra Costa Co.	3	33	36	39
Contra Costa County Total	11	253	264	287
Marin County				
Belvedere	0	0	0	0
Corte Madera	0	3	3	3
Fairfax	0	6	6	2
Larkspur	0	6	6	3
Mill Valley	0	4	4	6
Novato	1	9	10	16
Ross	0	1	1	1
San Anselmo	1	3	4	6
San Rafael	1	35	36	37
Sausalito	0	3	3	3
Tiburon	0	0	0	1
Unincorporated Marin County	0	9	9	12
Marin County Total	3	79	82	89
Napa County				
American Canyon	0	2	2	1
Calistoga	0	4	4	2
Napa	0	34	34	29
St. Helena	0	4	4	4
Yountville	0	1	1	1
Unincorporated Napa County	0	3	3	3
Napa County Total	0	48	48	40
San Francisco (City and County)				
San Francisco Total	21	856	877	934

BICYCLE-INVOLVED COLLISIONS

2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
0	17	17	20
1	23	24	33
1	10	11	11
0	5	5	7
1	22	23	27
0	31	31	39
3	204	207	277
0	0	0	0
0	20	20	10
0	1	1	4
0	2	2	4
0	0	0	5
0	27	27	25
0	2	2	1
0	10	10	9
0	37	37	44
0	17	17	17
0	0	0	2
2	41	43	36
2	157	159	156
0	3	3	2
0	2	2	2
0	35	35	38
0	6	6	5
0	0	0	0
0	9	9	13
0	55	55	61
1	308	309	379

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

JURISDICTION	PEDESTRIAN-INVOLVED COLLISIONS				BICYCLE-INVOLVED COLLISIONS			
	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998-2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998-2002 ANNUAL AVG. FATAL and INJURY
San Mateo County								
Atherton	0	2	2	2	0	1	1	5
Belmont	0	4	4	7	0	3	3	7
Brisbane	0	1	1	1	0	0	0	1
Burlingame	0	20	20	16	0	9	9	9
Colma	0	3	3	3	0	0	0	1
Daly City	2	45	47	39	1	11	12	10
East Palo Alto	0	23	23	23	0	9	9	14
Foster City	0	2	2	3	0	4	4	6
Half Moon Bay	0	6	6	4	0	7	7	5
Hillsborough	0	1	1	2	0	3	3	2
Menlo Park	1	13	14	17	0	19	19	21
Millbrae	0	2	2	7	0	2	2	4
Pacifica	0	7	7	8	0	4	4	4
Portola Valley	0	0	0	0	1	2	3	2
Redwood City	0	44	44	36	0	39	39	41
San Bruno	0	18	18	20	0	4	4	11
San Carlos	0	10	10	10	0	7	7	8
San Mateo	0	36	36	46	0	42	42	53
South San Francisco	1	22	23	26	0	14	14	19
Woodside	0	0	0	0	0	9	9	10
Unincorporated San Mateo Co.	1	11	12	15	0	38	38	37
San Mateo County Total	5	270	275	286	2	227	229	270
Santa Clara County								
Campbell	2	6	8	7	1	12	13	14
Cupertino	0	13	13	14	0	24	24	32
Gilroy	1	8	9	11	0	10	10	11
Los Altos	0	8	8	10	0	24	24	23
Los Altos Hills	0	0	0	0	0	4	4	5
Los Gatos	0	3	3	7	0	8	8	14
Milpitas	0	12	12	15	0	14	14	19
Monte Sereno	0	1	1	0	0	1	1	0

Injury and Fatal Collisions Involving Bicyclists and Pedestrians, 2002 (continued)

PEDESTRIAN-INVOLVED COLLISIONS					BICYCLE-INVOLVED COLLISIONS			
JURISDICTION	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY	2002 FATAL	2002 INJURY	2002 FATAL and INJURY	1998–2002 ANNUAL AVG. FATAL and INJURY
Morgan Hill	1	7	8	5	0	7	7	8
Mountain View	3	10	13	22	0	43	43	50
Palo Alto	1	26	27	27	0	66	66	78
San Jose	23	257	280	361	3	262	265	328
Santa Clara	1	21	22	30	0	26	26	39
Saratoga	0	0	0	3	0	17	17	15
Sunnyvale	1	28	29	32	0	34	34	47
Unincorporated Santa Clara Co.	1	11	12	16	1	31	32	33
Santa Clara County Total	34	411	445	560	5	583	588	716
Solano County								
Benicia	0	6	6	7	0	4	4	6
Dixon	1	5	6	5	0	2	2	3
Fairfield	4	38	42	41	0	23	23	37
Rio Vista	0	4	4	1	0	3	3	1
Suisun City	0	6	6	6	0	3	3	6
Vacaville	0	14	14	15	0	22	22	21
Vallejo	1	50	51	48	0	25	25	33
Unincorporated Solano County	0	4	4	5	0	5	5	5
Solano County Total	6	127	133	129	0	87	87	111
Sonoma County								
Cloverdale	0	1	1	1	0	2	2	3
Cotati	0	1	1	3	0	2	2	4
Healdsburg	0	0	0	3	0	4	4	4
Petaluma	0	20	20	22	1	18	19	30
Rohnert Park	0	10	10	8	0	11	11	12
Santa Rosa	2	54	56	57	1	62	63	83
Sebastopol	0	4	4	5	0	6	6	7
Sonoma	0	5	5	7	0	5	5	5
Windsor	0	2	2	2	0	3	3	3
Unincorporated Sonoma County	1	22	23	28	1	27	28	41
Sonoma County Total	3	119	122	136	3	140	143	191
BAY AREA TOTAL	111	2,910	3,021	3,223	19	2,321	2,340	2,782

Appendix D:
**Pavement Condition of
Bay Area Jurisdictions, 2002**

Pavement Condition Index (PCI) for Bay Area Jurisdictions

2002 Average PCI	Jurisdiction	2001 Average PCI ²
Very Good		
86 ¹	City of Santa Clara	80
85 ¹	Brentwood	85
84	Los Altos	86
83	Contra Costa County (unincorporated)	82
82	Foster City	73
82 ¹	Oakley	84
82	Sunnyvale	78
81	Fairfield	72
81 ¹	Vacaville	74
80	Campbell	76
79	Danville	79
79 ¹	Livermore	74
78 ¹	Concord	78
78 ¹	Pinole	78
77 ¹	Emeryville	70
77	Fremont	72
76 ¹	Pleasant Hill	79
76 ¹	South San Francisco	74
75 ¹	City of Alameda	76
75 ¹	Gilroy	76
75 ¹	Newark	74
75 ¹	San Ramon	75
75 ¹	Windsor	81
Good		
74	Alameda County (unincorporated)	79
74	Benicia	73
74	Mountain View	77
74 ¹	Redwood City	69
73	Belvedere	86
73 ¹	Dixon	75
72	Cupertino	79
72	Daly City	73

2002 Average PCI	Jurisdiction	2001 Average PCI ²
Good		
72 ¹	Los Altos Hills	73
72	Los Gatos	65
72	Morgan Hill	76
72 ¹	Orinda	72
72 ¹	Tiburon	69
71 ¹	Martinez	70
71 ¹	Yountville	70
70 ¹	Atherton	76
70	City of Sonoma	70
70 ¹	Clayton	71
70 ¹	Corte Madera	72
69	Antioch	71
69 ¹	Brisbane	73
69	Cloverdale	69
69	Hayward	68
69 ¹	Milpitas	71
69 ¹	Portola Valley	73
69	Rohnert Park	72
68	Novato	71
68 ¹	Pleasanton	68
68	San Carlos	68
67 ¹	Colma	67
67	Cotati	69
67 ¹	Dublin	70
67	Pacifica	69
67 ¹	Saratoga	68
66	Piedmont	73
66 ⁴	San Francisco (City and County)	68 ⁴
66	San Jose	59
66	Santa Rosa	70
66	Solano County (unincorporated)	57
65 ¹	Healdsburg	65

Pavement Condition Index (PCI) for Bay Area Jurisdictions (continued)

2002 Average PCI	Jurisdiction	2001 Average PCI ²
Good		
65 ¹	Hillsborough	67
65	San Bruno	61
64 ¹	Hercules	72
64	Napa County (unincorporated)	55
64	San Leandro	63
64	Santa Clara County (unincorporated)	64
63 ¹	American Canyon	79
63 ¹	Belmont	66
63	Mill Valley	66
63	Ross	65
63	San Pablo	60
63	Suisun City	69
63	Woodside	61
62	Burlingame	77
62	Calistoga	54
62	East Palo Alto	59
62	Moraga	NA
62	Rio Vista	NA
62	San Anselmo	65
62	San Mateo County (unincorporated)	53
61	Fairfax	45
61	Sebastopol	64
61 ¹	St. Helena	61
Fair		
60 ¹	Albany	64
59	Berkeley	66
59	Lafayette	60
59	Menlo Park	67
58	Pittsburg	69
57	Vallejo	59
56 ¹	San Mateo	64

2002 Average PCI	Jurisdiction	2001 Average PCI ²
Fair		
56 ¹	Sausalito	56
54	Marin County (unincorporated)	57
53 ¹	Monte Sereno	NA
53 ¹	Richmond	54
52 ¹	El Cerrito	54
50	Sonoma County (unincorporated)	46
49 ¹	City of Napa	53
48 ¹	Half Moon Bay	43
48 ¹	Petaluma	51
No Data		
NA	Larkspur	53 ³
NA	Millbrae	NA
NA	Oakland	NA
NA	Palo Alto	NA
NA	San Rafael	71 ³
NA	Union City	NA
NA	Walnut Creek	NA

Source: Metropolitan Transportation Commission

2002 PCI scores based on pavement databases updated in 2002 unless noted.

¹ PCI score is an estimate based on inspections done between 1999 and 2001. (See note on page 57.)

² PCI score is based on inspections done between 1998 and 2001.

³ Jurisdiction uses an alternate pavement management system in which scoring scale is comparable with PCI.

⁴ Score has been correlated to the PCI scale from an alternate pavement management system.

NA = not available

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